

CLAIMS

1. An encoder for encoding a first bit stream,
comprising:

means for generating a second bit stream from the first
bit stream, the second bit stream having one or
5 more different corresponding bit values than the
first bit stream; and

means for encoding the second bit stream.

2. The encoder of Claim 1, wherein the means for
encoding comprises a constitute encoder.

10 3. The encoder of Claim 1, wherein the means for
generating a second bit stream comprises at least one of a
ones complementer and a differential encoder.

4. An encoder for encoding a first bit stream,
comprising:

15 means for generating a second bit stream from the first
bit stream, the second bit stream having one or
more different corresponding bit values than the
first bit stream;

means for generating a first bit and a second bit for
20 each bit in the first bit stream; and

means for generating a third bit and a fourth bit for
each bit in the second bit stream.

5. The encoder of Claim 4, wherein the means for
generating a second bit stream comprises at least one of a
25 ones complementer and a differential encoder.

6. An encoder for encoding a first bit stream, comprising:

means for generating a first encoder first bit and a first encoder second bit for each bit in the first bit stream;

means for generating a second bit stream from the first bit stream, the second bit stream having one or more different corresponding bit values than the first bit stream;

means for generating a second encoder first bit and a second encoder second bit for each bit in the second bit stream; and

means for multiplexing the first bit stream, the first encoder first bit, the first encoder second bit, the second encoder first bit, and the second encoder second bit.

7. The encoder of Claim 6, wherein the means for generating a first encoder first bit and a first encoder second bit comprises a constitute encoder.

8. The encoder of Claim 6, wherein the means for generating a second encoder first bit and a second encoder second bit comprises a constitute encoder.

9. The encoder of Claim 6, wherein the means for generating a second bit stream comprises at least one of a ones complemeter and a differential encoder.

10. The encoder of Claim 6, further comprising means for interleaving at least one of the first bit stream and the second bit stream.

11. A method for encoding a first bit stream,
comprising:

receiving the first bit stream;

encoding the first bit stream with a first encoder to
generate a first encoder first bit and a first
encoder second bit for each bit in the first bit
stream;

generating a second bit stream from the first bit
stream, the second bit stream having one or more
different corresponding bit values than the first
bit stream;

encoding the second bit stream with a second encoder to
generate a second encoder first bit and a second
encoder second bit for each bit in the second bit
stream; and

multiplexing the first bit stream, the first encoder
first bit, the first encoder second bit, the
second encoder first bit, and the second encoder
second bit.

12. The method of Claim 11, further comprising
generating a reordered bit stream to change the ordering of
the bits in at least one of the first bit stream and the
second bit stream.

13. The method of Claim 11, wherein the step of
generating a second bit stream comprises at least one of a
ones complemener and a differential encoder.

14. A method for encoding a first bit stream,
comprising:

receiving the first bit stream;

encoding the first bit stream with a first encoder to generate a first encoder first bit and a first encoder second bit for each bit in the first bit stream;

5 generating a second bit stream from the first bit stream, the second bit stream having one or more different corresponding bit values than the first bit stream;

10 generating an interleaved bit stream from the second bit stream;

encoding the interleaved bit stream to generate a second encoder first bit and a second encoder second bit for each bit in the interleaved bit stream; and

15 multiplexing the first bit stream, the first encoder first bit, the first encoder second bit, the second encoder first bit, and the second encoder second bit.

15. The method of Claim 14, wherein the step of
20 encoding the first bit stream further comprises utilizing a constitute encoder to generate a first encoder first bit and a first encoder second bit.

16. The method of Claim 14, wherein the step of
25 encoding the interleaved bit stream further comprises utilizing a constitute encoder to generate a second encoder first bit and a second encoder second bit.

17. The method of Claim 14, wherein the step of generating a second bit stream comprises at least one of a ones complemener and a differential encoder.

18. A decoder for decoding a first bit stream of received bits, comprising:

first decoding means for converting a stream of first decoder first bits, a stream of first decoder second bits, the first bit stream, and a second stream of probability values that the corresponding received bit is a one from an early iteration, to a first stream of probability values that the corresponding received bit is a one;

first sign inverting means for inverting the signs of the first stream of probability values;

means for generating a second bit stream from the first bit stream, the second bit stream having one or more different corresponding bit values than the first bit stream;

second decoding means for converting the first stream of probability values, the second bit stream, a stream of second decoder first bits, and a stream of second decoder second bits, to a second stream of probability values that the corresponding bit of the second bit stream is a zero; and

second sign inverting means for inverting the signs of the second stream of probability values.

19. The decoder of Claim 18, further comprising an interleaver means for reordering at least one of the first bit stream and the second bit stream.

20. The decoder of Claim 18, wherein the means for generating a second bit stream comprises at least one of a ones complemeter and a differential encoder.

21. A decoder for decoding a first bit stream of received bits, comprising:

first decoding means for converting a stream of first decoder first bits, a stream of first decoder second bits, the first bit stream, and a second stream of probability values that a corresponding received bit is a one from an early iteration, to a first stream of probability values that the corresponding received bit is a one;

first decoder interleaver means for reordering the stream of probability values to the order required by a second decoder;

first sign inverting means for inverting the signs of the first stream of probability values;

second decoder interleaver means for reordering the stream of received bits to the order required by the second decoder;

means for generating a second bit stream of the reordered bits, the second bit stream having one or more different corresponding bit values than the reordered bits produced by the second decoder interleaver means;

second decoding means for converting the first stream of probability values, the second bit stream, a stream of second decoder first bits, and a stream of second decoder second bits, to a second stream of probability values that the corresponding bit of the second bit stream is a one;

de-interleaver means for reordering the second stream of probability values for reordering the second stream of probability values to the order required by the first decoder;

second sign inverting means for inverting the signs of
the second stream of probability values; and
decision unit means for allowing one or more iterations
of determining the second stream of probability
values.

22. The decoder of Claim 22, wherein the means for
generating a second bit stream comprises at least one of a
ones complemeter and a differential encoder.

23. A method for decoding a first bit stream of
received bits, comprising:

converting a stream of first decoder first bits, a
stream of first decoder second bits, the first bit
stream, and a second stream of probability values
from an early iteration, to a first stream of
probability values that the corresponding bit of
the first bit stream is a one;

inverting the signs of the first stream of probability
values;

generating a second bit stream from the first bit
stream, the second bit stream having one or more
different corresponding bit values than the first
bit stream;

converting the first stream of probability values, the
second bit stream, a stream of second decoder
first bits, and a stream of second decoder second
bits, to a second stream of probability values
that the corresponding bit of the second bit
stream is a zero;

inverting the signs of the second stream of probability
values; and

repeating the above steps a specified number of iterations.

24. The method of Claim 23, further comprising interleaving at least one of the first bit stream and the
5 second bit stream.

25. The method of Claim 23, wherein the step of generating a second bit stream comprises at least one of a ones complementer and a differential encoder.

26. A method of decoding a first bit stream of
10 received bits, comprising:

converting a stream of first decoder first bits, a stream of first decoder second bits, the first bit stream, and a second stream of probability values that the corresponding received bit is a one from
15 an early iteration, to a first stream of probability values that the corresponding bit in the first bit stream is a one;

reordering the first stream of probability values to the order required by a second decoder;

20 inverting the signs of the first stream of probability values;

interleaving the first bit stream of received bits to the order required by the second decoder, creating a reordered bit stream;

25 generating a second bit stream of the reordered bits, the second bit stream having one or more different corresponding bit values than the first bit stream;

converting the first stream of probability values, the second bit stream, a stream of second decoder first bits, and a stream of second decoder second bits, to a second stream of probability values that the corresponding bit of the ones complement bit stream is a zero;

de-interleaving the second stream of probability values for reordering the second stream of probability values to the order required by the first decoder; inverting the signs of the second stream of probability values; and

repeating the above steps a specified number of iterations.

27. The method of Claim 26, wherein the step of generating a second bit stream comprises at least one of a ones complementer and a differential encoder.

28. A signal representing a bit stream, comprising for each original bit of the bit stream:

a first bit identical to the original bit;

a first plurality of bits representing an encoding by one or more encoders of the original bit; and

a second plurality of bits representing an encoding by one or more encoders of a modified bit, the modified bit being generated by applying at least one of a ones complementer and a differential encoder, wherein the first bit, the first plurality of bits, and the second plurality of bits are multiplexed together.

29. An apparatus comprising an encoder for encoding a first bit stream, comprising:

means for generating a second bit stream from the first bit stream, the second bit stream having one or more different corresponding bit values than the first bit stream;

5 means for encoding a first bit and a second bit for each bit in the first bit stream; and
means for encoding a third bit and a fourth bit for each bit in the second bit stream.

10 30. The apparatus of Claim 29, wherein the means for generating a second bit stream comprises at least one of a ones complementer and a differential encoder.

31. An apparatus comprising an encoder for encoding a first bit stream, comprising:

15 means for generating a first encoder first bit and a first encoder second bit for each bit in the first bit stream;

20 means for generating a second bit stream from the first bit stream, the second bit stream having one or more different corresponding bit values than the first bit stream;

means for generating a second encoder first bit and a second encoder second bit for each bit in the second bit stream; and

25 means for multiplexing the first bit stream, the first encoder first bit, the first encoder second bit, the second encoder first bit, and the second encoder second bit.

30 32. The apparatus of Claim 31, wherein the means for generating a second bit stream comprises at least one of a ones complementer and a differential encoder.

33. A module comprising an encoder for encoding a first bit stream, comprising:

means for generating a first encoder first bit and a first encoder second bit for each bit in the first bit stream;

means for generating a second bit stream from the first bit stream, the second bit stream having one or more different corresponding bit values than the first bit stream;

means for generating a second encoder first bit and a second encoder second bit for each bit in the second bit stream; and

means for multiplexing the first bit stream, the first encoder first bit, the first encoder second bit, the second encoder first bit, and the second encoder second bit.

34. An apparatus comprising a decoder for decoding a first bit stream of received bits, comprising:

first decoding means for converting a stream of first decoder first bits, a stream of first decoder second bits, the first bit stream, and a second stream of probability values that the corresponding received bit is a one from an early iteration, to a first stream of probability values that the corresponding received bit is a one;

first sign inverting means for inverting the signs of the first stream of probability values;

means for generating a second bit stream from the first bit stream, the second bit stream having one or more different corresponding bit values than the first bit stream;

second decoding means for converting the first stream of probability values, the second bit stream, a second decoder first bit, and a second decoder second bit, to a second stream of probability values that the corresponding bit of the second bit stream is a zero; and

second sign inverting means for inverting the signs of the second stream of probability values.

35. A module comprising a decoder for decoding a first bit stream of received bits, comprising:

first decoding means for converting a stream of first decoder first bits, a stream of first decoder second bits, the first bit stream, and a second stream of probability values that the corresponding received bit is a one from an early iteration, to a first stream of probability values that the corresponding received bit is a one;

first sign inverting means for inverting the signs of the first stream of probability values;

means for generating a second bit stream from the first bit stream, the second bit stream having one or more different corresponding bit values than the first bit stream;

second decoder means for converting the first stream of probability values, the second bit stream, a second decoder first bit, and a second decoder second bit, to a second stream of probability values that the corresponding bit of the second bit stream is a zero; and

second sign inverting means for inverting the signs of the second stream of probability values.